ABB Industrial Low Voltage Drives

Drive Selection Guide

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The Worldwide Leader in Drives, built one application at a time.

ABB

ABB is one of the largest technology companies in the world with broad industry knowledge and geographic scope. It has approximately 109,000 employees in over 100 countries and occupies a leading position (1, 2 or 3) in each industry and product area it serves.

ABB offers complete industry and process-specific solutions, from products to turnkey projects in utilities, oil, gas and petrochemicals, manufacturing and consumer industries, and process industries. ABB also offers world-class collaborative business platforms and solutions based on open-architecture software.

AC Drives

AC drives are used to control the speed and torque of a standard induction motor, the workhorse of industry. ABB is a market leader in both motors and drives worldwide.

AC drive technology provides complete control of motor speed, increasing the productivity and efficiency of the driven process. When low capacity is required, the drive reduces the machine speed and saves energy.

Accurate speed control of the manufacturing process optimizes the quality of the end product. The Direct Torque Control (DTC) developed by ABB, and used in the ACS800, has improved control accuracy by making speed encoders unnecessary.

DC Drives

Before AC drives, there were DC drives, and DC is still the most economical solution for many applications. ABB DC drives and motors are used worldwide. We are the industry leader.

Our newest DC drive, the DCS800, combines the newest control technology with a proven power platform. We design our drives with innovations and features that make DC technology easier than ever before. The DCS800's simple interface and rich feature set allow you to commission your drive quickly and adapt it easily to your specific application.

Using the ABB Drive Selection Guide

Selecting the proper drive for your application requires some knowledge of the application and a sequential analysis of that data. Follow the steps outlined in this guide to determine the important characteristics of your application. After completing the activities in the Drive Selection Guide, you will have accurately captured the drive requirements unique to your specific application. Using this information, you will be able to select the ABB drive most appropriate for you.

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ABB Drive Feature Comparison

	ACS55 (1)	ACS150	ACS350
Power			
4 Quadrant Regeneration	N/A	N/A	N/A
Common Bus	N/A	N/A	N/A
Dynamic Brake	N/A	Internal Chopper Standard	Internal Chopper Standard
EMC Filter	Optional	Internal 2nd Environment	Internal 2nd Environment
Maximum Motor Lead Length	30 - 75m	30-50m without Choke 60-100m with Choke (R1, R2)	30-50m without Choke 60-100m with Choke
Maximum Output Frequency	130Hz	500Hz	500Hz
Motor Control	V/Hz Only	V/Hz Only	V/Hz, Sensorless Vector, and Flux Vector
Overload Torque	150% for 1 minute	150% for 1 minute	150% for 1 minute 180% for 2 seconds
Speed Regulation	3 - 5% Open Loop	0.5% Open Loop	**Static Accuracy** 20% of Motor Slip, Open Loop **Dynamic Accuracy** <2%/sec with 100% Torque Step, Open Loop
Torque Regulation	N/A	N/A	±0.5% Open Loop ±0.1% Closed Loop
Supply Voltage Ratings	115V, 200/240V 1φ	200/240V 1φ, 200/240V 3φ, 380/480V 3φ	200/240V 1φ, 200/240V 3φ, 380/480V 3φ
Horsepower Ratings	1/4 to 3Hp	1/2 to 5Hp	1/2 to 15Hp (2)
Environmental			
Available Enclosure Types	IP20	IP20, Optional NEMA 1	IP20, Optional NEMA 1
Rated Operating Altitudes	1000m (derate 2000m)	1000m (derate 2000m)	1000m (derate 2000m)
Rated Power Operating Temperature	-20 to +40ºC up to 50ºC derate 1%/1ºC	-10 to +40ºC up to 50ºC derate 1%/1ºC	-10 to +40ºC up to 50ºC derate 1%/1ºC

1) The ACS50 will be replaced by the ACS55 in November, 2007
2) 25 Hp (480V), 10 Hp (240V) in December, 2007

ACS550

ACS800

DCS800

N/A	Optional	Optional
N/A	Yes	N/A
Internal Chopper through 15Hp Optional External Brake Unit	Internal Chopper Standard through 25Hp Optional Internal Chopper through 600Hp	DB Contactor Control Included
Internal 1st Environment	Internal Optional 2nd Environment Optional 1st Environment	Optional/External
100-200m without Choke 150-350m with Choke	100-200m without Choke 150-350m with Choke	Any length is managable. May be limited by feedback cable length
500Hz	300Hz	N/A
V/Hz, Sensorless Vector, and Flux Vector	V/Hz and Direct Torque Control (exceeds Flux Vector performance)	Closed loop speed with or without trandducer
150% for 1 minute 180% for 2 seconds	150% for 1 minute 200% for 10 seconds	150% for 1 minute
Static Accuracy 20% of Motor Slip, Open Loop **Dynamic Accuracy** <2%/sec with 100% Torque Step, Open Loop	**Static Accuracy** 10% of Motor Slip, Open Loop **Dynamic Accuracy** <1%/sec with 100% Torque Step, Open Loop	.005% nominal speed with encoder 0.1% nominal speed with tachometer
±0.5% Open Loop ±0.1% Closed Loop	±0.4% Open Loop ±0.1% Closed Loop Plus Full Torque at Zero Speed	±0.1%
200/240V 1φ, 200/240V 3φ, (3) 480V 3φ, 600V 3φ	240V 3φ, 480V 3φ, 690V 3φ	240-500,600,700,800,1000,1200 VDC
3/4 to 550Hp	1 to 3000Hp	10-4000 Hp

IP21/ UL Type 1, IP54/ UL Type 12 (4)	IP21/ UL Type 1, IP42, IP54/ UL Type 12	IP00
1000m (derate 2000m)	1000m	1000m
-15 to +40ºC up to 50ºC derate 1%/1ºC	-15 to +40ºC up to 50ºC derate 1%/1ºC	0 to +40ºC up to 55ºC with derate 1%/1ºC

3) For operation of ACS550 240V rated drives on single phase power, derate the output current by 50%.
4) Flange mounting kits are available for NEMA 1 and NEMA 12 protection.

ABB Drive Feature Comparison

	ACS55 (1)	ACS150	ACS350
Hardware Features			
Accel / Decel Times	0.1 to 30 seconds	0.1 to 1800 seconds	0.1 to 1800 seconds
Analog Inputs	(1) Configurable 0 - 10V, 0 - 20mA, or Potentiometer Reference	(1) Configurable 0 - 10V, 0 - 20 mA	(2) Configurable unipolar or bi-polar voltage, 0 -10V, 0 - 20mA
Analog Outputs	N/A	N/A	(1) Non-isolated, 0 - 20 mA
Communications	N/A	N/A	ModBus, DeviceNet, Profibus, CANopen, and Modbus/TCP, Ethernet IP available (Q4, 07)
Critical Frequencies	N/A	3	3
Digital Inputs	(3) 12 to 24 VDC Fixed Function - Start/Stop, Reverse, Jog	(5) 12 to 24V DC All Programmable Pulse Train (0 to 16 kHz)	(5) 12 to 24V DC All Programmable Pulse Train (0 to 10 kHz)
Function Blocks	N/A	N/A	8 Standard
PID Loop	N/A	N/A	(1) Loop with Sleep (1) Loop without Sleep
Power Loss Ride-Through	0.2 to 0.5 seconds	0.2 to 0.5 seconds	0.2 to 0.5 seconds
Program Interface	(8) DIP Switches (3) Potentiometers	Basic LCD	None, Basic LCD, or Advanced LCD
Outputs	(1) N.O. Relay Contact (Run or Fault)	1 Form C Relay (NO + NC)	(1) Form C Relay, (1) Transistor 100mA / 30 VDC (N.O. + N.C.)
Special or Custom Firmware	N/A	N/A	Panel Software
DriveWare	DriveConfig Kit	FlashDrop	DriveWindow Light, FlashDrop

1) The ACS50 will be replaced by the ACS55 in November, 2007

ACS550

ACS800

DCS800

0.1 to 1800 seconds	0.0 to 1800 seconds	0 to 30000 seonds
(2) Configurable 0 - 10V, 0 - 20mA, or Potentiometer Reference	(3) Isolated as a Group (2) 0 - 20mA, (1) 0 - 10V	(4) Standard (16 bit), expandable to (8) (2) +/- 10V, 0-10V, +/-20mA, 0-20mA (2) +/-10V, 0-10V
(2) Non-Isolated, 0 - 20mA	(2) Non-Isolated, 0 - 20mA	(3) standard expandable to (7) -10 or 0 to 10V
RS485 Standard, Ethernet /IP, Modbus/TCP, CanOpen, ControlNet, DeviceNet, Profibus-DP	Ethernet/IP, Modbus/TCP, Modbus, CanOpen, ControlNet, DeviceNet, Profibus-DP	Ethernet /IP , Modbus/TCP, Modbus, CanOpen, ControlNet, DeviceNet, Profibus-DP
3	3	N/A
(6) 12 to 24V DC Standard (6) 120/230V AC Optional All Programmable	(6) 24V DC Plus Start Interlock Standard (6) 120/230V AC Optional All Programmable	(8) 24 VDC Standard (6) 24 VDC, 120/230 VAC Optional All Programmable
N/A	15 Standard, 200 Optional	16 Standard, hundreds optional
(2) Loops without Sleep (1) Loop with Sleep	(2) Loops	(2) Loops
6 to 7 seconds	6 to 7 seconds	N/A, use DB contactor and resistor
Advanced Interface with Real Time Clock, Full Graphic LCD Screen, Soft Keys, and Parameter Upload / Download	LCD Standard Interface with Start-up Assistant, parameter Upload / Download, Alphanumeric Keypad	Advanced Interface with Real Time Clock, Full Graphic LCD Screen, Soft Keys, and Parameter Upload / Download
(3) Relays with (1) N.O. and (1) N.C. Contact Each 2A, 230V Maximum (3) Optional relays with (1) NO and (1) NC Contacts 2A, 230V Maximum, Programmable	(3) Relays with (1) N.O. and (1) N.C. Contact each [Form C] 2A, 230V Maximum, Programmable	(7) 24 VDC and (1) N.O. contact are standard (4) 24VDC, 120/230 VAC optional All Programmable
Fan/Pump Control and Panel Software	Pump / Fan Control, Crane and Hoist, Inline, Center Winder, Master Follower, Position Control, Permanent Magnet Motor and more.	Master Follower Crane and Hoist (available Q1, 2008) Center Winder (available Q1, 2008)
DriveWindow Light, FlashDrop	DriveWindow, DriveWindow Light, Drive AP	DriveWindow Light - Included DriveWindow - Optional

ABB Drive Family Descriptions

ACS55 Adjustable Speed AC Drives (1)

The ACS55 can be integrated easily into existing panels, replacing contactors and motor starters; it's compact size is also ideal for new installations, or wherever energy savings of small AC induction motors is desired.

Typical Applications

The ABB ACS55 Component Drive can be used in a wide range of industries. Typical applications include pumps and fans, as well as constant-torque applications such as material handling. The ABB ACS55 Component Drive is ideal for those situations where a low cost, easy to install and operate product is needed.

Features Include

- Fast set-up
- Compact size and slim shape
- DIN rail mounting
- Automatic switching frequency up to 16 kHz
- DriveConfig Kit - configuration of unpowered drives

Highlights

- 0.25 to 0.5 Hp (120V)
  0.25 to 3 Hp (240V)
- Protected Chassis (IP 20)
- UL, cUL, C-Tick, GOST-R and CE approved
- Coated boards as standard
- RoHs (verify label)
- Suitable for domestic applications
- Optional built-in EMC filter
- Optional potentiometer

ACS150 Adjustable Speed AC Drives

The ABB ACS150 component drives meet the requirements of OEMs, system integrators and panel builders. This drive device is a component that is brought together with other components. The drive is stocked, and the number of options and variants are optimized for distribution.

Typical Applications

The ABB ACS150 component drives are designed to meet the requirements of an extensive range of machinery applications. The drive is ideal for food and beverage, material handling, rubber and plastics, and woodworking applications.

Features Include

- Integral Control Panel - clear LCD display with backlight
- Fixed potentiometer for frequency setting
- Built-in EMC filter for 2nd environment
- Built-in brake chopper as standard

Highlights

- 0.5 to 3 Hp (240V)
  0.5 to 5 Hp (480V)
- FlashDrop (v1.31b+) - *see page 14*
- Coated boards as standard
- Unified height and depth
- UL, cUL, C-Tick and CE approved
- RoHs (verify label)
- NEMA 1 Kit
- Pulse train frequency input

1) The ACS50 will be replaced by the ACS55 in November, 2007

ABB Drive Family Descriptions

ACS350 Adjustable Speed AC Drives

The ABB ACS350 general machinery drive is designed specifically for the OEM machine building sector. In this sector, the manufacturing time per unit is critical. The ACS350 is designed to be the fastest drive in terms of installation, setting parameters and commissioning. The ACS350 has been designed to be as user-friendly as possible, yet provide high application flexibility. The ACS350 offers diverse functionality to cater to the most demanding needs.

Features Include

- Sensorless Vector Motor Control
- (8) Sequence programming
- Optimized interfaces for users and machines
- Built-in brake chopper as standard
- Built-in 2nd environment EMC filter
- High-speed communications

Highlights

- 0.5 to 5 Hp (240V)
  0.5 to 15 Hp (480V) (1)
- FlashDrop (v2.41a+) - *see page 14*
- Unified height and depth
- Coated boards as standard
- UL, cUL, C-Tick, GOST-R and CE approved
- RoHs (verify label)
- NEMA 1 Kit
- DriveWindow Light - Programming tool
- NEMA 4X (IP66) keypad cover mounting
- Pulse Encoder interface
- Potentiometer with Start/Stop and Forward/Reverse switches
- Pulse train frequency input

ACS550 Adjustable Speed AC Drives

The ABB ACS550 standard drive is simple to buy, install, configure and use, saving considerable time. The drive has common user and process interface with fieldbus, common software tools for sizing, commissioning, maintenance, and common spare parts.

Typical Applications

The ABB ACS550 is ideal for those situations where there is a need for simplicity to install, commission and operate, and where customizing or special product engineering is not required.

Features Include

- Easy installation
- Trouble-free start-up
- Intuitive operation
- Sensorless Vector Control

Highlights

- Advanced control panel permitting intuitive operation
- Patented swinging choke for superior harmonic reduction
- Built-in 1st environment EMC filter
- Built-in Modbus with optional internally mounted fieldbus adapters available
- UL, cUL listed and CE approved (600V product is CSA only)
- FlashDrop (v 3.11a+) - *see page 14*
- Coated boards as standard
- Built-in brake chopper up to 15Hp
- Start-up Assistants
  These asssistants include: Diagnostic, Maintenance, Start-up, PID Controller, Real-time Clock, Serial Comm, Drive Optimizer
- DriveWindow Light - Programming tool
- Relay output extension module
- Pulse Encoder interface
- 115/230V Digital Input Interface
- NEMA 3R enclosure option
- Flange Mounting Kits

1) 25 Hp (480V), 10 Hp (240V) in December, 2007

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ABB Drive Family Descriptions

ACS800 Adjustable Speed AC Drives

Common technology for different applications

One of the main benefits of the ACS800 series is a wide range of drive products with common technologies. This includes Start-up Assistant, Adaptive Programming and DTC, common user and process interfaces, software tools for sizing, commissioning and maintenance, and common spare parts.

Premium Technology - Direct Torque Control

The heart of the ACS800 is DTC - Direct Torque Control. It's a first class motor control system. The consistently excellent performance of the ACS800 guarantees that the drive is not the limiting factor in your process.

DTC technology is well proven in various applications and demanding environments, guaranteeing the high reliability of the drive.

Start-up Assistant

ABB AC drives have always been top of their class in user-friendliness. This product series brings a whole new meaning to "user-friendliness." Thanks to the Start-up Assistant, the commissioning and tuning of a high-performance drive could not be easier.

Adaptive Programming

The ACS800 goes one step further (compared to normal parameter programming) with the addition of Adaptive Programming. It is like having a small PLC inside your drive. Adaptive Programming needs no additional hardware or software but is always there when needed.

Integration and Compact Design

Anything that is required from an AC drive, like EMC and harmonic filters, is inside the drive, so no extra space or cabling is needed. Furthermore, there is always space inside the ACS800 for three option modules for I/O extensions, fieldbuses, pulse encoder interface or a PC connection.

Flexibility

The ACS800 family is a fully configurable product line. It allows the customer to choose what they need and want. The ACS800 is avialble in a number of packages and configurations:

Standard Module Drives (1 to 600 Hp):
Designed for efficient installation in user supplied enclosures and offer the most cost-effective solution for performance drives.

Standard Wall Mount Drives (1 to 200 Hp):
Available in NEMA 1 or NEMA 12 enclosures and ready for installation right on the factory floor.

Cabinet Drives (100 to 3000 Hp):
Available in NEMA 1 or NEMA 12 enclosures. Available with hundreds of option combinations, these drives are built to your order and standards.

Low Harmonic Drives:
Available from 10 to 125 Hp in a NEMA 1 wall mount drive and from 75 to 2800 Hp in a NEMA 1 or NEMA 12 cabinet drive. ABB's ULH drives meet IEEE 519-1992 at the drive's AC input terminals.

Regenerative AC Drives
Available from 10 to 125 Hp in a NEMA 1 wall mount drive and from 75 to 2600 Hp in a NEMA 1 or NEMA 12 cabinet drive.

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Direct Torque Control Technology

DTC Technology - key in the ACS800 family

Direct Torque Control is an optimized motor control method for AC drives that allows direct control of all the core motor variables. This opens up AC drive capabilities never before realized and offers benefits for all applications.

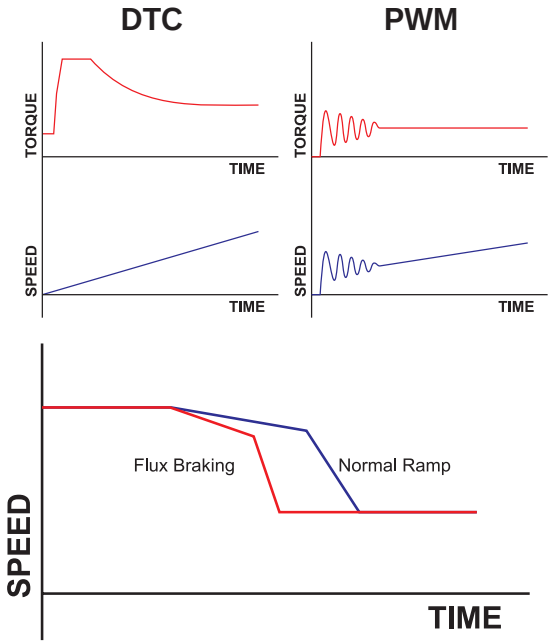
What is Direct Torque Control?

Direct Torque Control, DTC, is a revolutionary motor control method for AC drives which allows accurate control of both motor speed and torque-- without pulse encoder feedback from the motor shaft, down to zero speed!

In DTC, stator flux and torque are used as primary control variables. The motor-state calculations are updated by the high speed digital signal processor at 40,000 times a second in the advanced motor software model. Due to the continuous updating of the motor state and the comparison of the actual values to the reference values, every single switching in the drive is determined separately. This feature will always produce the optimal switching combination and can instantly react to dynamic changes such as load shocks or power interruptions. In DTC, there is no need for a separate voltage and frequency controlled pulse width modulator.

Unequalled motor speed & torque control

Open-loop dynamic, speed-control accuracy matches that of AC drives using closed loop flux vector control. The ACS800 delivers static speed control accuracy of 0.1% to 0.5% of nominal speed - more than adequate for most industrial applications. In applications requiring even more precise speed regulation, an optional pulse encoder can be used. With an open-loop torque step rise time of less than 5 milliseconds - compared to over 100 ms in AC drives using sensorless flux vector control - the ACS800 AC dive is unbeatable.



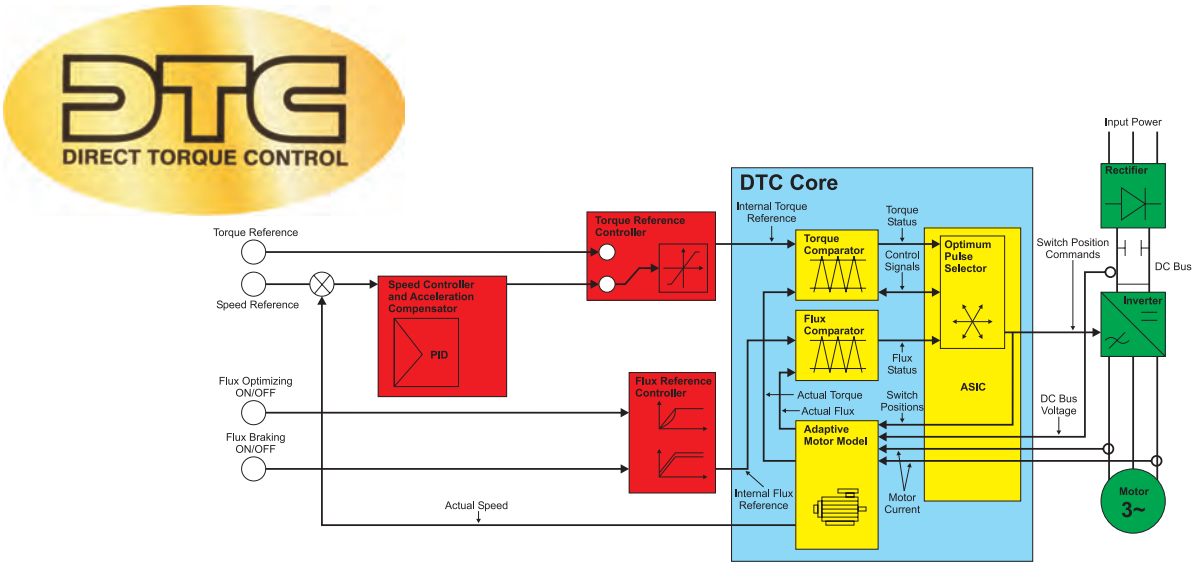


ABB Drive Family Descriptions

DCS800 Adjustable Speed DC Drives

The latest technology on a proven platform

The DCS800 DC industrial drive is the latest drive from ABB, combining the newest control technology with a thyristor power platform that has been factory-proven all over the world. The DCS800 boasts a wider power range than any other DC drive on the market. The hardware and software are designed with you, the user, in mind. Special features make installation and configuration simple and allow you to customize the application to your needs.

Start-up Assistant

The Start-up assistant is part of the standard DCS800 DC drives software package. It guides you through the commissioning procedure either through the control panel or with your PC using DriveWindow Light. It is multilingual, requests data with clear and plain text messages, and sets the required parameters to your needs.

Adaptive Programming

Adaptive programming gives you the ability to customize the drive to your needs without adding more hardware. Change how a digital output works, modify speed or torque reference, or filter an analog input - all these things are possible. You program the drive with the control panel or you PC using DriveWindow Light. Sixteen function blocks are available. If more are required, Control Builder, which uses compact flash memory, is available with expanded capacity.

Macros

DCS800 drives are equipped with macros to cover the most frequent parameter settings. macros are pre-programmed parameter subsets. The functions of inputs and outputs and elements of the control structure are set up by downloading the macro. Macros will configure for: basic operation, torque control, manual/auto, manual/motor-pot, and motor-pot operation.

Additional Features

Use one or more of the following features to make the drive work for you:

- AC and DC contactor control
- DC breaker control
- Motor brake control
- Motor temperature monitoring
- Ramp stop, DB stop, and torque limit stop
- Field weakening
- Field heating (field economy)
- Field reversal
- Two motor control
- Master-Follower operation
- 12-pulse operation
- Flying start
- Drive position display

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Industrial Ethernet & Fieldbus Control

ABB LV Drives provide connectivity to major automation systems. The easy to install plug-in communication adapter allows for connectivity to traditional fieldbus protocols and industrial Ethernet protocols. As a result of the wide range of communication modules, your choice for an automation system becomes independent of your decision to use first-class ABB AC drives.

Benefits:

Capital Expenditure Savings:

- **Cabling:**
  Substituting the large amount of conventional drive control cabling with a single twisted pair reduces costs and increases system reliability.

- **Machine Commissioning:**
  The modular machine configuration allows pre-commissioning of single machine sections and provides easy and fast assembly of the complete installation.

- **Machine Expansion:**
  Serial communication simplifies the latest trend of modular machine design, enabling expansion of the installation at a later stage with little effort.

Operational Expenditure Savings:

Process control and system maintenance is considerably improved reducing operational expenses.

Features:

Industrial Ethernet Protocols:

- Modbus/TCP
- EtherNet/IP
- Ethernet (ACS800 DDCS)
- PROFINET (Future 2008)

Fieldbus Protocols:

- ControlNet
- CANopen
- DeviceNet
- Modbus
- Profibus-DP

Industrial Ethernet & Fieldbus modules are designed to application protocol specifications

Drive Control:

Through the selected protocol adapter it is possible to send control commands – start, stop, run enable, reset, control ramp generator, speed or torque reference, PID reference, etc - to the drive

Drive Supervision:

A set of drive parameters and/or actual signals - torque, speed, position, current, etc - can be selected for cyclic data transfer

Diagnostics:

Accurate and reliable diagnostic information can be obtained via the drive – alarm, limit and fault words – reducing the downtime of the drive and the manufacturing process.

FlashDrop (MFDT-01)

The new ABB FlashDrop is a powerful palm sized tool for fast and easy parameter selection and setting. The tool can copy parameters between two identical drives, or between a PC and a drive, making it suitable for volume customization as well as fast and easy commissioning.

With the FlashDrop (MFDT-01) tool, the drive is not connected to the mains. It is not even necessary to unpack the drive during parameter setting, thus improving safety at work.

Faster volume customization

DrivePM (Drive Parameter Manager) is a software tool, included within the FlashDrop package, to create, edit and copy parameter sets.

FlashDrop stores a maximum of 20 unique parameter sets and 8 drive templates and, if needed, the parameters can be adjusted within the tool. The user selects a parameter set and by simply pushing one button, the parameters are downloaded from the FlashDrop tool to each drive in less than three seconds. This quickens commissioning considerably, especially with multiple drives.

Safer working environment

The robust FlashDrop tool is battery-operated and can be freely used at installation sites or at the premises of a distributor. The drives are not connected to the mains during parameter setting thereby, enhancing the safety of the user.

The FlashDrop user can hide each parameter/group from the drive's display, which means that the drive user does not see the parameter/group at all. This protects the drive and connected machinery, while the drive users see only parameters relevant for the application.

For the drive distributor, installer and user, utilizing the FlashDrop tool improves safety at work.

FlashDrop DrivePM PC software

PC software, DrivePM (Drive Parameter Manager), is included in the FlashDrop package. With DrivePM, the user can create, edit, file and copy complete sets of parameters for different drive applications. The parameter sets can be named descriptively, which helps in identifying the correct file.

FlashDrop (MFDT-01) package includes

- FlashDrop tool
- DrivePM software (CD-rom)
- User's manual (hardcopy and PDF)
- RS232 cable for connection between PC and the FlashDrop tool
- Battery charger

Compatibility with ABB drives

The FlashDrop tool is compatible with the following ABB drives:

- ACS150 (v1.31b+)
- ACS350 (v2.41a+)
- ACS550 (v 3.11a+, May 7, 2007+) R1-R6 frames
- ACH550 (v 3.11a+, May 7, 2007+) R1-R6 frames

Service Products

To reduce the total cost of owning ABB drives and to maximize their availability, ABB offers the following services:

ABB maintenance services

ABB maintenance services ensure optimal operation of your drives, and extends their useful life.

On-site spares kits

On-site spares kits contain the most critical spare parts for your AC drives. The contents of the kit can be chosen according to the number of drives in use. Having a spares kit on site reduces the downtime of equipment and increases the availability of critical processes.

Start-up services

Using ABB's start-up services you can trust that your drives are correctly commissioned and well-tuned to their application. ABB employs authorized professionals who have been thoroughly trained for their job.

Service Organization

ABB has a service organization that spans the globe. Contact your local ABB sales office for more information about our services.

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ABB Training

ABB offers a variety of formal End-User training programs, from Classroom / Lab training to Internet - led programs using a “web-based” Voice over IP system. We also offer several CBT (computer based training) programming CDs to be used as basic drives training and programming.

Class schedules, locations, costs can be obtained, or class enrollment can be done through our Drives website (www.abb.us/drives)

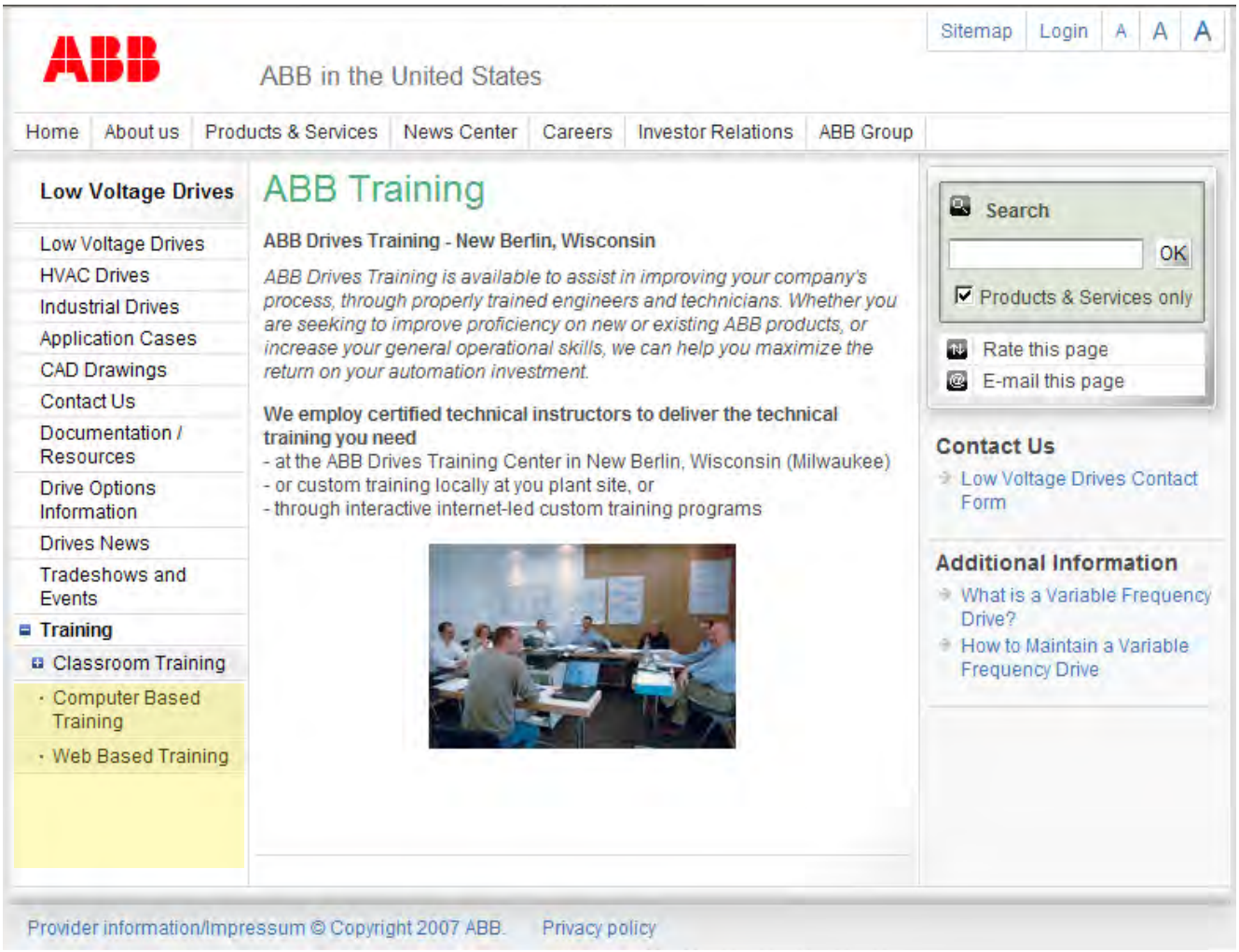
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ABB Drives Training is available to assist in improving your company's process, through properly trained engineers and technicians. Whether you are seeking to improve proficiency on new or existing ABB products, or increase your general operational skills, we can help you maximize the return on your automation investment.
We employ certified technical instructors to deliver the technical training you need
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- or custom training locally at you plant site, or
- through interactive internet-led custom training programs
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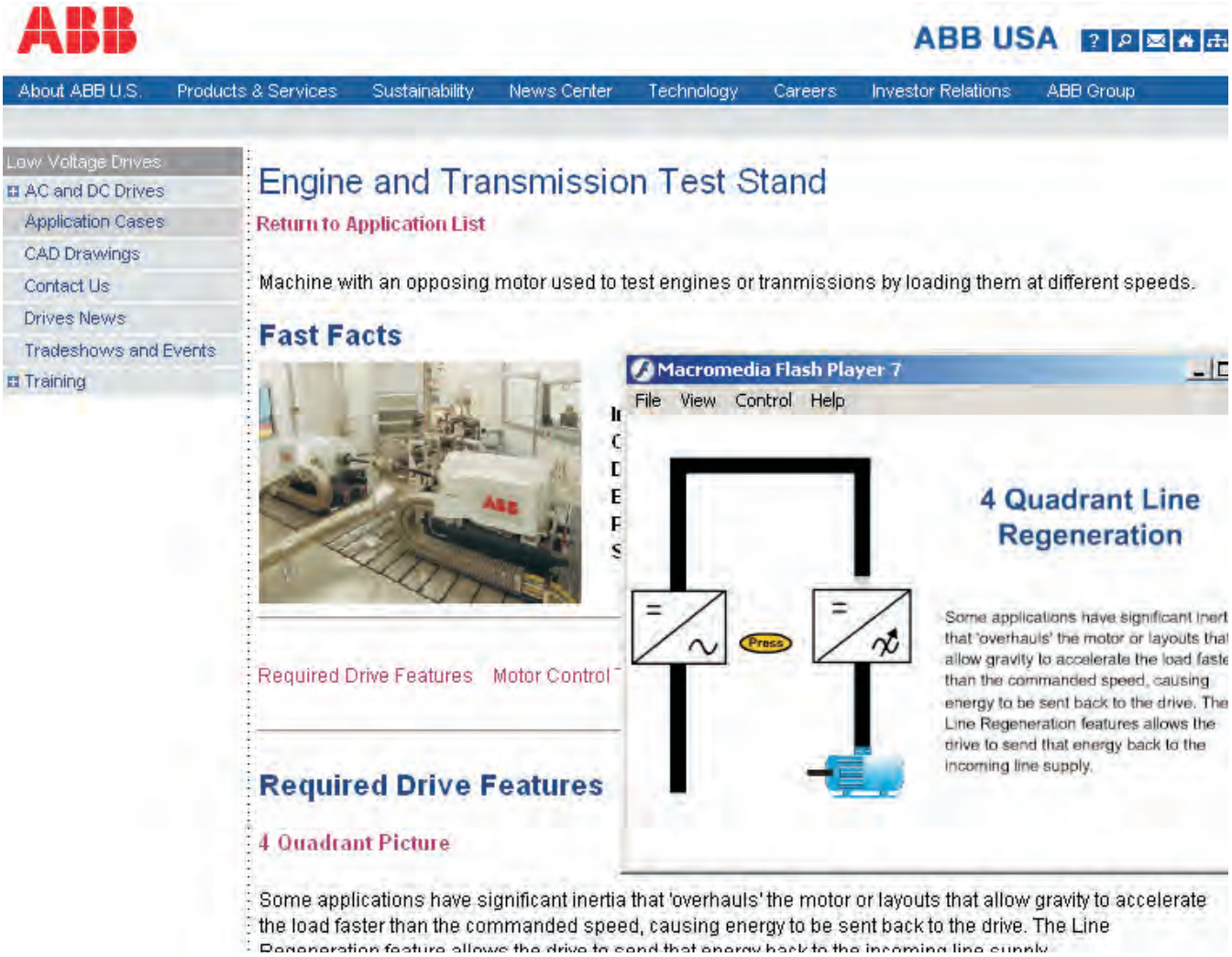
ABB Drive Applications

To make it easy for you to match your application needs with our Drives products, ABB has created the following pages as an overview of various industry-specific applications that can be supported by ABB products. Using this information, you will be able to review feature requirements unique to your application and then use the questionnaire forms included at the back of the guide to match an ABB drive with that application.

More information is also available on the ABB Low Voltage Drives website at: http://www.abb.us/drives.

Select “Application Cases” from the left menu and this will give you access to information about your application, required drive features, and more.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Return to Application List
Machine with an opposing motor used to test engines or tranmissions by loading them at different speeds.
Fast Facts
Macromedia Flash Player 7
File View Control Help
4 Quadrant Line Regeneration
Press
Some applications have significant inert
that 'overhauls' the motor or layouts tha
allow gravity to accelerate the load faste
than the commanded speed, causing
energy to be sent back to the drive. The
Line Regeneration features allows the
drive to send that energy back to the
incoming line supply.
Required Drive Features
Motor Control
Required Drive Features
4 Quadrant Picture
Some applications have significant inertia that 'overhauls' the motor or layouts that allow gravity to accelerate the load faster than the commanded speed, causing energy to be sent back to the drive. The Line

Material Handling

Belt Conveyor
A device for moving product from one place to another, using a continuous belt rotated by rollers on each end.

Chain Conveyors
A continuous-loop chain used to suspend product and move it from point to point or through a process.

Diverter
A moving arm or controlled rollers used to move a part or package from one conveyor to another conveyor or bin.

Palletizer
A machine that places product in a specific pattern of multiple layers onto a pallet for storage, transport or shipping.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Cooling / Baking Conveyor
A device for baking or cooling product on wire rack type material rather than a belt.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive displacement blowers.

Hoist
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum.

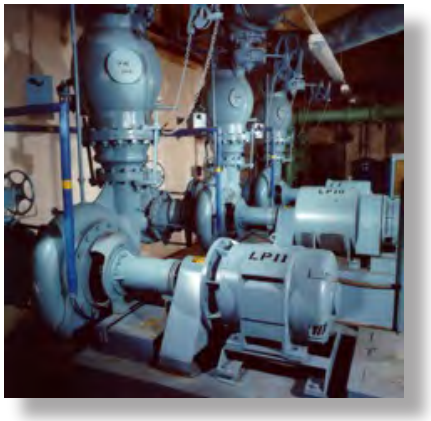
Crane
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum. Includes gantry operation to move the load laterally.

Material Handling

	Drive Features Required																						Motor Control Type	Regulation Type
	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range		
Belt Conveyor				✓							✓			✓		✓					✓		30:1	V/Hz	Speed
Chain Conveyors		✓	✓		✓				✓	✓	✓			✓		✓	✓				✓		40:1	FV, DTC or DC	Torque
Diverter								✓			✓		✓								✓		40:1	SV, DTC or DC	Torque
Palletizer				✓				✓		✓	✓		✓		✓						✓		10:1	SV	Speed
Centrifugal Fan / Pump	✓		✓				✓	✓		✓		✓		✓			✓						4:1	V/Hz	Speed
Cooling / Baking Conveyor			✓			✓		✓			✓			✓							✓		30:1	V/Hz	Speed
Centrifugal Pumps	✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Pumps	✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Centrifugal Compressors	✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Compressors	✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Hoist				✓		✓		✓		✓	✓				✓	✓	✓		✓		✓	✓	100:1	FV, DTC or DC	Torque
Crane				✓		✓		✓		✓	✓				✓	✓	✓	✓	✓		✓	✓		DTC or DC	Speed & Torque

Mining and Cement

Belt Conveyor
A device for moving product from one place to another using a continuous belt rotated by rollers on each end.



Auger Conveyor
A screw in a confined trough or tube, used to move material by rotating the screw. In some cases, the auger is also used for mixing or cooking.

Ball Mill
A large rotating drum filled with steel balls used to pulverize rock or ore in preparation for mineral extraction or processing.

Rotary Kiln
A long, large-diameter, horizontal cylinder used as a continuous oven to cause a chemical reaction between ingredients.

Induced Draft Fan
A centrifugal fan that creates suction on the outflow end of the process, drawing air to the inflow.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Beater Type Mixer
Machine with large beaters used to mix ingredients, including making dough.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Mining and Cement

	Drive Features Required																		Motor Control Type	Regulation Type
	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Communications	Critical Avoidance Frequencies	Digital I/O	Dynamic Brake	Dynamic Response	Fan / Pump Control	Long Motor Cable Length	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Speed Range		
Belt Conveyor	✓			✓					✓		✓	✓					✓	30:1	FV, DTC or DC	Speed
Auger Conveyor			✓						✓		✓	✓		✓	✓		✓	20:1	V/Hz, DTC or DC	Speed
Ball Mill							✓	✓	✓			✓					✓	10:1	SV	Speed
Rotary Kiln	✓		✓				✓	✓	✓			✓			✓		✓	10:1	SV, DTC or DC	Speed
Induced Draft Fan	✓		✓			✓		✓		✓			✓					10:1	V/Hz	Speed
Centrifugal Fan / Pump	✓		✓			✓	✓	✓		✓	✓		✓					4:1	V/Hz	Speed
Beater Type Mixer									✓			✓					✓	40:1	SV or DTC	Speed
Centrifugal Pumps	✓		✓		✓	✓	✓			✓	✓		✓		✓	✓		2:1	V/Hz	Speed
Positive Displacement Pumps	✓		✓		✓	✓	✓				✓	✓	✓		✓			10:1	V/Hz or SV	Speed
Crusher / Pulverizer							✓		✓			✓						60:1	FV, DTC or DC	Speed

Rubber and Plastics

Belt Conveyor
A device for moving product from one place to another, using a continuous belt rotated by rollers on each end.

Chain Conveyors
A continuous loop chain used to suspend product and move it from point to point or through a process.

Auger Conveyor
A screw in a confined trough or tube, used to move material by rotating the screw. In some cases, the auger is also used for mixing or cooking.

Induced Draft Fan
A centrifugal fan that creates suction on the outflow end of the process, drawing air to the inflow.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Extruder
A machine used to shape a material by forcing it through a die.

Blown Film
A machine used to shape a material into a thin sheet by blowing it through a die.

Injection Molding
A machine that is used to shape a material by injecting it into a mold.

Blow Molding
A machine used to shape material by blowing it into a mold.

Beater Type Mixer
Machine with large beaters used to mix ingredients, including making dough.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive displacement blowers.

Center Driven Winder
A spool used to wrap up web or wire at the end of a process.

Hoist
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum.

Screw Compressor
A machine with an auger shaped shaft used to compress a gas.

Crane
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum. Includes gantry operation to move the load laterally.

Rubber and Plastics

	Drive Features Required																							Motor Control Type	Regulation Type
	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	High Maximum Frequency	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range		
Belt Conveyor	✓			✓							✓			✓		✓					✓		30:1	V/Hz	Speed
Chain Conveyors		✓	✓		✓				✓	✓	✓			✓		✓	✓				✓		40:1	FV, DTC or DC	Torque
Auger Conveyor			✓								✓			✓		✓		✓	✓		✓		20:1	V/Hz	Speed
Induced Draft Fan	✓		✓				✓			✓		✓					✓						10:1	V/Hz	Speed
Centrifugal Fan / Pump	✓		✓				✓	✓		✓		✓		✓			✓						4:1	V/Hz	Speed
Extruder			✓	✓				✓			✓					✓					✓		60:1	FV, DTC or DC	Torque
Blown Film			✓					✓			✓					✓					✓		60:1	FV, DTC or DC	Torque
Injection Molding			✓					✓			✓					✓					✓		60:1	FV or DTC	Torque
Blow Molding			✓					✓			✓					✓					✓		60:1	FV, DTC or DC	Torque
Beater Type Mixer											✓					✓					✓		40:1	SV, DTC or DC	Speed
Cooling / Baking Conveyor			✓			✓		✓			✓			✓							✓		30:1	V/Hz	Speed
Centrifugal Pumps	✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Pumps	✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Centrifugal Compressors	✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Screw Compressor											✓						✓				✓		10:1	V/Hz	Speed
Positive Displacement Compressors	✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Center Driven Winder	✓		✓	✓		✓		✓		✓	✓		✓			✓	✓		✓	✓	✓		100:1	FV, DTC or DC	Speed
Hoist				✓		✓		✓		✓	✓				✓	✓	✓		✓		✓	✓	100:1	FV, DTC or DC	Torque
Crane				✓		✓		✓		✓	✓				✓	✓	✓	✓	✓		✓	✓	100:1	DTC or DC	Speed & Torque

Food and Beverage

Belt Conveyor
A device for moving product from one place to another, using a continuous belt rotated by rollers on each end.

Chain Conveyors
A continuous-loop chain used to suspend product and move it from point to point or through a process.

Auger Conveyor
A screw in a confined trough or tube, used to move material by rotating the screw. In some cases, the auger is also used for mixing or cooking.

Diverter
A moving arm or controlled rollers used to move a part or package from one conveyor to another conveyor or bin.

Palletizer
A machine that places product in a specific pattern of multiple layers onto a pallet for storage, transport or shipping.

Induced Draft Fan
A centrifugal fan that creates suction on the outflow end of the process, drawing air to the inflow.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Extruder
A machine used to shape a material by forcing it through a die.

Sugar Centrifuge
A large rotating drum that rapidly spins to separate liquid from solid in the sugar-refining process.

Beater Type Mixer
Machine with large beaters used to mix ingredients, including making dough.

Cooling / Baking Conveyor
A device for baking or cooling product on wire-rack-type material rather than a belt.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive displacement blowers.

Hoist
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum.

Screw Compressor
A machine with an auger shaped shaft used to compress a gas.

Crane
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum. Includes gantry operation to move the load laterally.

Food and Beverage

	Drive Features Required																									Motor Control Type	Regulation Type
	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	High Maximum Frequency	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Preset Speeds	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range		
Belt Conveyor	✓			✓							✓				✓		✓						✓		30:1	V/Hz	Speed
Chain Conveyors		✓	✓		✓				✓	✓	✓				✓		✓	✓					✓		40:1	FV, DTC or DC	Torque
Auger Conveyor			✓								✓				✓		✓		✓	✓			✓		20:1	V/Hz	Speed
Diverter								✓			✓		✓										✓		40:1	SV	Torque
Palletizer				✓				✓		✓	✓		✓			✓							✓		10:1	SV	Speed
Induced Draft Fan	✓		✓				✓			✓		✓						✓							10:1	V/Hz	Speed
Centrifugal Fan / Pump	✓		✓				✓	✓		✓		✓			✓			✓							4:1	V/Hz	Speed
Extruder			✓	✓				✓			✓						✓						✓		60:1	FV, DTC or DC	Torque
Sugar Centrifuge	✓		✓		✓			✓		✓	✓			✓			✓			✓	✓	✓	✓		20:1	SV, DTC or DC	Speed
Beater Type Mixer											✓						✓						✓		40:1	SV, DTC or DC	Speed
Cooling / Baking Conveyor			✓			✓		✓			✓				✓								✓		30:1	V/Hz	Speed
Centrifugal Pumps	✓		✓			✓	✓	✓				✓			✓			✓		✓		✓			2:1	V/Hz	Speed
Positive Displace-ment Pumps	✓		✓			✓	✓	✓							✓		✓	✓		✓					10:1	V/Hz or SV	Speed
Centrifugal Compressors	✓		✓			✓	✓	✓				✓			✓			✓		✓		✓			2:1	V/Hz	Speed
Screw Compressor											✓							✓					✓		10:1	V/Hz	Speed
Positive Displace-ment Compressors	✓		✓			✓	✓	✓							✓		✓	✓		✓					10:1	V/Hz or SV	Speed
Hoist				✓		✓		✓		✓	✓					✓	✓	✓		✓			✓	✓	100:1	FV, DTC or DC	Torque
Crane				✓		✓		✓		✓	✓					✓	✓	✓	✓	✓			✓	✓	100:1	DTC or DC	Speed & Torque

Consumer Goods

Belt Conveyor
A device for moving product from one place to another, using a continuous belt rotated by rollers on each end.

Chain Conveyors
A continuous-loop chain used to suspend product and move it from point to point or through a process.

Palletizer
A machine that places product in a specific pattern of multiple layers onto a pallet for storage, transport or shipping.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Extruder
A machine used to shape a material by forcing it through a die.

Injection Molding
A machine that is used to shape a material by injecting it into a mold.

Beater Type Mixer
Machine with large beaters used to mix ingredients, including making dough.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive-displacement blowers.

Center Driven Winder
A spool used to wrap up web or wire at the end of a process.

Hoist
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum.

Screw Compressor
A machine with an auger shaped shaft used to compress a gas.

Punch Press
A machine used to shape or cut material, typically metal, by forcing a die down onto the material.

Crane
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum. Includes gantry operation to move the load laterally.

Consumer Goods

	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	High Maximum Frequency	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range	Motor Control Type	Regulation Type
Belt Conveyor	✓			✓							✓				✓		✓					✓		30:1	V/Hz	Speed
Chain Conveyors		✓	✓		✓				✓	✓	✓				✓		✓	✓				✓		40:1	FV, DTC or DC	Torque
Palletizer				✓				✓		✓	✓		✓			✓						✓		10:1	SV	Speed
Centrifugal Fan / Pump	✓		✓				✓	✓		✓		✓			✓			✓						4:1	V/Hz	Speed
Extruder			✓	✓				✓			✓						✓					✓		60:1	FV, DTC or DC	Torque
Injection Molding			✓					✓			✓						✓					✓		60:1	FV or DTC	Torque
Beater Type Mixer											✓						✓					✓		40:1	SV	Speed
Centrifugal Pumps	✓		✓			✓	✓	✓				✓			✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Pumps	✓		✓			✓	✓	✓							✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Centrifugal Compressors	✓		✓			✓	✓	✓				✓			✓			✓		✓	✓			2:1	V/Hz	Speed
Screw Compressor											✓							✓				✓		10:1	V/Hz	Speed
Positive Displacement Compressors	✓		✓			✓	✓	✓							✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Center Driven Winder	✓		✓	✓		✓		✓		✓	✓			✓			✓	✓		✓	✓	✓		100:1	FV, DTC or DC	Speed
Hoist				✓		✓		✓		✓	✓					✓	✓	✓		✓		✓	✓	100:1	FV, DTC or DC	Torque
Punch Press			✓							✓	✓	✓					✓			✓		✓		30:1	SV or DTC	Speed
Crane				✓		✓		✓		✓	✓					✓	✓	✓	✓	✓		✓	✓	100:1	DTC or DC	Speed & Torque

Textile

Palletizer
A machine that places product in a specific pattern of multiple layers onto a pallet for storage, transport or shipping.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive-displacement blowers.

Center Driven Winder
A spool used to wrap up web or wire at the end of a process.

Textile Machines
Spinning and traverse motions are combined in smooth operation and coordination to produce synthetic yarn.

Hoist
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum.

Screw Compressor
A machine with an auger shaped shaft used to compress a gas.

Crane
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum. Includes gantry operation to move the load

Textile

	Drive Features Required																										
	4 Quadrant Line Regeneration	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	High Maximum Frequency	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range	Synchronous Motors	Motor Control Type	Regulation Type
Palletizer					✓				✓	✓	✓		✓			✓						✓		10:1		SV	Speed
Centrifugal Fan / Pump		✓		✓				✓	✓	✓		✓			✓			✓						4:1		V/Hz	Speed
Centrifugal Pumps		✓		✓			✓	✓	✓			✓			✓			✓		✓	✓			2:1		V/Hz	Speed
Positive Displacement Pumps		✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1		V/Hz or SV	Speed
Centrifugal Compressors		✓		✓			✓	✓	✓			✓			✓			✓		✓	✓			2:1		V/Hz	Speed
Screw Compressor											✓							✓				✓		10:1		V/Hz	Speed
Positive Displacement Compressors		✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1		V/Hz or SV	Speed
Center Driven Winder		✓		✓	✓		✓		✓	✓	✓			✓			✓	✓		✓	✓	✓		100:1		FV, DTC or DC	Speed
Textile Machines					✓						✓			✓				✓		✓		✓			✓	DTC	Speed & Torque
Engine / Transmission Test Stand	✓				✓	✓	✓	✓	✓	✓	✓						✓	✓	✓				✓	100:1		DTC or DC	Torque
Hoist					✓		✓		✓	✓	✓					✓	✓	✓		✓		✓	✓	100:1		DTC or DC	Torque
Crane					✓		✓		✓	✓	✓					✓	✓	✓	✓	✓		✓	✓	100:1		DTC or DC	Speed & Torque

Water / Waste Water

Auger Conveyor
A screw in a confined trough or tube, used to move material by rotating the screw. In some cases, the auger is also used for mixing or cooking.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Beater Type Mixer
Machine with large beaters used to mix ingredients, including making dough.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive-displacement blowers.

Screw Compressor
A machine with an auger shaped shaft used to compress a gas.

Water / Waste Water

	Drive Features Required																		
	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Communications	Critical Avoidance Frequencies	Digital I/O	Dynamic Brake	Dynamic Response	Fan / Pump Control	Long Motor Cable Length	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Speed Range	Motor Control Type	Regulation Type
Auger Conveyor			✓					✓		✓	✓		✓	✓		✓	20:1	V/Hz	Speed
Centrifugal Fan / Pump	✓		✓		✓	✓	✓		✓	✓		✓					4:1	V/Hz	Speed
Beater Type Mixer								✓			✓					✓	40:1	SV or DTC	Speed
Centrifugal Pumps	✓		✓	✓	✓	✓			✓	✓		✓		✓	✓		2:1	V/Hz	Speed
Positive Displacement Pumps	✓		✓	✓	✓	✓				✓	✓	✓		✓			10:1	V/Hz or SV	Speed
Centrifugal Compressors	✓		✓	✓	✓	✓			✓	✓		✓		✓	✓		2:1	V/Hz	Speed
Screw Compressor								✓				✓				✓	10:1	V/Hz	Speed
Positive Displacement Compressors	✓		✓	✓	✓	✓				✓	✓	✓		✓			10:1	V/Hz or SV	Speed

Automotive

Belt Conveyor
A device for moving product from one place to another, using a continuous belt rotated by rollers on each end.

Chain Conveyors
A continuous-loop chain used to suspend product and move it from point to point or through a process.

Diverter
A moving arm or controlled rollers used to move a part or package from one conveyor to another conveyor or bin.

Centrifugal Fan / Pump
A fan or pump whose load characteristics vary proportional to speed.

Extruder
A machine used to shape a material by forcing it through a die.

Injection Molding
A machine that is used to shape a material by injecting it into a mold.

Centrifugal Pumps
Typical types include influent, effluent, and booster.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Centrifugal Compressors
Air and gas compressors are two examples.

Positive Displacement Compressors
Some examples include screw compressors and positive-displacement blowers.

Engine / Transmission Test Stand
Machine with an opposing motor used to test engines or transmissions by loading them at different speeds.

Hoist
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum.

Screw Compressor
A machine with an auger shaped shaft used to compress a gas.

Punch Press
A machine used to shape or cut material, typically metal, by forcing a die down onto the material.

Crane
A drum wrapped with cable or rope used to raise and lower loads vertically by rotating the drum. Includes gantry operation to move the load laterally.

Automotive

	Drive Features Required																								Motor Control Type	Regulation Type
	4 Quadrant Line Regeneration	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range		
Belt Conveyor		✓			✓							✓			✓		✓					✓		30:1	V/Hz	Speed
Chain Conveyors			✓	✓		✓				✓	✓	✓			✓		✓	✓				✓		40:1	FV, DTC or DC	Torque
Diverter									✓			✓		✓								✓		40:1	SV	Torque
Centrifugal Fan / Pump		✓		✓				✓	✓		✓		✓		✓			✓						4:1	V/Hz	Speed
Extruder				✓	✓				✓			✓					✓					✓		60:1	FV, DTC or DC	Torque
Injection Molding				✓					✓			✓					✓					✓		60:1	FV or DTC	Torque
Extruder				✓					✓			✓					✓					✓		60:1	FV, DTC or DC	Torque
Centrifugal Pumps		✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Pumps		✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Centrifugal Compressors		✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Screw Compressor												✓						✓				✓		10:1	V/Hz	Speed
Positive Displacement Compressors		✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Engine / Transmission Test Stand	✓				✓	✓	✓	✓	✓		✓	✓					✓	✓	✓			✓		100:1	FV, DTC or DC	Torque
Hoist					✓		✓		✓		✓	✓				✓	✓	✓		✓		✓	✓	100:1	FV, DTC or DC	Torque
Punch Press				✓							✓	✓	✓				✓			✓		✓		30:1	SV, DTC, or DC	Speed
Crane					✓		✓		✓		✓	✓				✓	✓	✓	✓	✓		✓	✓	100:1	DTC or DC	Speed & Torque

Oil and Gas

Centrifugal Pumps
A pump whose load characteristics vary proportional to speed.

Positive Displacement Pumps
Including metering and chemical-feed pumps.

Recirculation Fans
A fan whose load characteristics vary proportional to speed.

Compressors
A machine with an auger shaped shaft used to compress a gas.

Oil and Gas

	Drive Features Required																								Motor Control Type	Regulation Type
	4 Quadrant Line Regeneration	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range		
Centrifugal Pumps		✓		✓			✓	✓	✓				✓		✓			✓		✓	✓			2:1	V/Hz	Speed
Positive Displacement Pumps		✓		✓			✓	✓	✓						✓		✓	✓		✓				10:1	V/Hz or SV	Speed
Recirculation Fans		✓		✓				✓	✓		✓		✓		✓			✓						4:1	V/Hz	Speed
Compressors												✓						✓				✓		10:1	V/Hz	Speed

Pulp and Paper

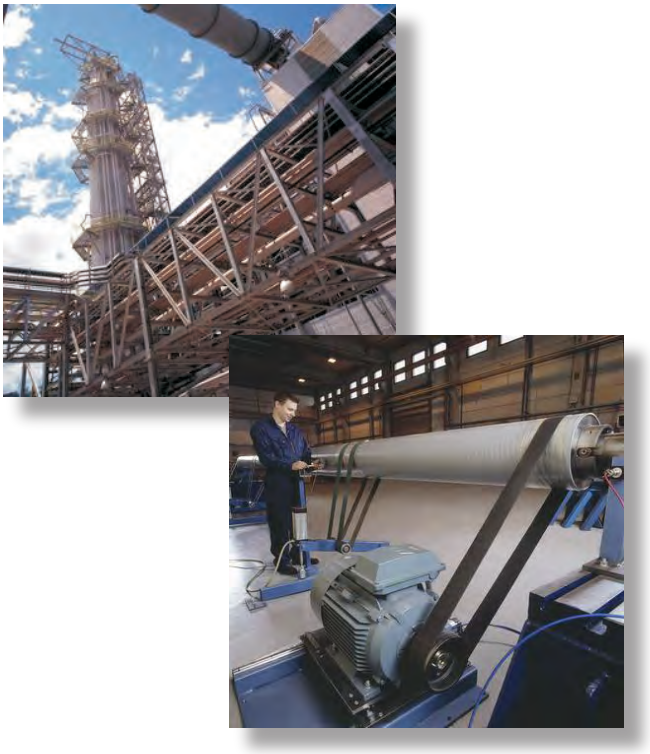
Mixing
A machine used to mix ingredients including pulp and dyes

Pumps
A pump whose load characteristics vary proportional to speed.

Converting
A machine used to change the shape or size/ format of materials such as slitting, embossing, and laminating.

Web Handling
A machine that transports and/or stores web materials. It may also involve additional web processes, such as coating and drying.

Chipper
A machine that uses large blades to ‘chip’ logs into smaller pieces for use in making pulp.



Pulp and Paper

	Drive Features Required																								Motor Control Type	Regulation Type
	4 Quadrant Line Regeneration	Long Accel / Decel	Selectable / Multiple Accel / Decel Rates	Analog I/O	Closed Loop	Common Bus	Communications	Critical Avoidance Frequencies	Digital I/O	Droop	Dynamic Brake	Dynamic Response	Fan / Pump Control	Function Blocks	Long Motor Cable Length	Mechanical Brake Control	Overload Torque	PID Loop	Position Regulation	Power Loss Ride-Through	Reconnect to a Spinning Motor (Flying Start)	Slip Compensation	Torque Proving	Speed Range		
Chipper				✓					✓		✓	✓					✓			✓		✓		10:1	SV	Speed
Mixing				✓					✓				✓				✓							10:1	SV or DTC	Speed & Torque
Flow / Pumps		✓		✓			✓	✓	✓					✓		✓		✓						4:1	V/Hz	Speed
Converting		✓		✓	✓		✓		✓	✓	✓						✓	✓		✓	✓	✓		100:1	SV, DTC or DC	Speed
Web Handling		✓		✓	✓		✓		✓	✓	✓						✓	✓		✓	✓	✓		100:1	SV, DTC or DC	Torque

Drive Features and Performance Explanation

The applications listed on the previous pages generally require specific performance and features from an AC drive. Below are brief explanations of those features.

Feature	Explanation	Choose...
4 Quadrant Line Regeneration	Some applications have significant inertia that 'overhauls' the motor or layouts that allow gravity to accelerate the load faster than the commanded speed, causing energy to be sent back to the drive. The Line Regeneration feature allows the drive to send that energy back to the incoming line supply.	A 4-Quadrant Drive
Long Accel / Decel	The drive can control the rate of acceleration and deceleration of the motor and load. These features control the amount of time the drive takes to increase or decrease the output during speed control.	A drive with programmable times sufficient for the application.
Selectable / Multiple Accel / Decel Rates	The drive can control multiple independent rates of acceleration and deceleration for the motor and load. These features control the amount of time the drive takes to increase or decrease the output during speed control.	A drive with multiple independent accel / decel times.
Analog I/O	Each application has specific requirements for I/O. Analog I/O is generally used to read process signals and output signals proportional to drive status. Analog I/O is generally Voltage (0-10V) or Current (0(4)-20mA). The type and number required by the application must match the drive.	A drive with sufficient number and type of analog I/O.
Closed Loop	Applications often require a precise measurement of load speed. Typically, an encoder is mounted to the motor shaft and its signal is used to indicate shaft speed. The drive can then adjust its output to the desired condition. Closed loop offers the highest accuracy and performance.	A drive with feedback capability, either as standard or as a plug-in option card.
Common Bus	Applications that involve multiple drives in a coordinated system often benefit from a common bus configuration. Drives are connected via their DC bus rather than the AC line. It allows energy to be shared between drives and reduces the number of components.	A drive that has the DC link terminals available and have been tested for common bus.
Communications	Applications that involve multiple drives or drives controlled by PLC or other supervisory device often require communications via a defined network.	A drive that has a standard or optional connection to the desired network.
Critical Avoidance Frequencies	Some applications have mechanical resonance points that cause the mechanics (shafts, belts, etc.) to oscillate. These oscillations can rapidly cause mechanical failure.	A drive that, through programming, can assure that these critical speeds are 'skipped' over and avoided.
Digital I/O	Each application has specific requirements for I/O. Digital I/O is generally used to control the drive (Start, Stop, Jog, etc.) and annunciate the drive status.	A drive that offers sufficient I/O and needed flexibility to perform all required functions.
Droop	Specifies the amount of base speed that the speed reference is reduced when at full load torque. Use the droop function to cause the motor speed to decrease when an increase in load occurs.	This function is normally associated with master/follower application. When required, a drive that provides master/follower firmware must be specified.
Dynamic Brake	Applications that require rapid deceleration or quick stops can regenerate energy back to the drive. A dynamic brake dissipates this energy through a resistor as heat.	A drive that has an internal DB chopper and connectable resistor or has an external DB kit.

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Feature	Explanation	Choose...
Dynamic Response	High performance applications often demand nearly instant response to changes in speed or torque commands or input status changes. The higher the dynamic response, the more capable the drive is in meeting these demands.	A drive that meets the response demands.
Fan / Pump Control	Many fan or pump installations have a wide spectrum of flow variations. These include water and sewage systems, process, and other industrial applications. Excellent flow control can be achieved by using a variable speed drive on one fan or pump and using the drive to control other units at fixed speed.	A drive with built-in Fan/ Pump Control software.
Function Blocks	Some processes require some basic logic functions (timers, boolean (and/or) logic, etc.) but are too small for a PLC or other logic controller.	A drive with internal function blocks that can be programmed to achieve the timer, etc. requirements.
High Maximum Frequency	Most applications operate at speeds at or below the motor rated speed (typically 1800 RPM (60Hz)) for the US and 1500 RPM (50Hz) elsewhere. Other applications such as high speed grinders and winders need to operate at much higher speeds, sometimes with special motors.	A drive that has a high enough maximum frequency to allow outputs high enough to achieve the needed motor speed.
Long Motor Cable Length	Motors are rated by the manufacturer for the voltage resistance of the insulation system. If this insulation system voltage is too low, voltage reflection from the drive could cause motor failure. This is particularly important if the motor is a long distance from the drive and if the motor is an older motor being retained for the application.	A drive that has the lowest dv/dt or long cable mode of operation.
Mechanical Brake Control	A mechanical brake is used for holding the motor and driven machinery at zero speed when the drive is stopped or not powered.	A drive with mechanical brake control.
Overload Torque	Applications may require varying degrees of overload capacity for starting, accelerating, or intermittent duty. This overload capacity must be supplied by the drive as current and by the motor as torque.	A drive that has sufficient overload capacity.
PID Loop	An internal function provides closed loop process control with proportional, integral and derivative (PID) control. The PID function reads an analog input to the drive and compares it to a desired setpoint. The PID loop adjusts the drive output frequency (and therefore the process) to make the input value equal the setpoint.	A drive with one or more internal PID loops to eliminate the need for external hardware.
Position Regulation	A feedback device on the motor or machine, typically an encoder or resolver, feeds position information to the drive. The drive compares this information to a desired setpoint and adjusts its output to place the load in the desired position.	A drive that offers this control method when positioning without a separate positioning controller is needed.
Power Loss Ride-Through	Applications that control a continuous process cannot afford to stop because of short power outages or dips. The process must continue to run through these outages, typically 2 to 3 cycles long.	A drive that has sufficient power loss ride-through capability.
Preset Speeds	A drive is typically speed controlled using a potentiometer or analog input device. If specific repeatable speeds are required, parameters can be used to preset operation of the drive at a pre-determined speed using a digital input.	A drive that provides preset speeds.
Reconnect to a Spinning Motor (Flying Start)	Applications with significant inertia and low friction tend to coast when stop commands, power interruptions or fault conditions occur. Many of these application require that when the condition disappears, the load must be reconnected at the 'coasting' speed / direction and returned to normal operation.	A drive with spinning motor reconnect or 'flying' start.

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Drive Features and Performance Explanation (continued)

Motor Control Type		
Volts per Hertz (V/Hz)	Applications that do not require significantly more torque than the original motor rating can most often be addressed by a drive using V/Hz algorithms. Loads, such as centrifugal fans and pumps or simple conveyors, are difficult to overload and therefore do not require the performance of other motor control algorithms. Simply maintaining a fixed ratio between drive output voltage and frequency is sufficient.	A drive that offers this motor control method when simple speed control with rated torque is required.
Sensorless Vector (SV)	Sensorless Vector is a motor control method that is often used to maximize torque production in the motor for loads that have significant overload requirements. It is NOT a torque control (regulation) method. This algorithm maintains a constant magnetizing (flux) current from zero to base motor speed. The output voltage is increased proportional to load. Automatic or manual tuning identifies key motor parameters including IR drop and nominal flux current, allowing automatic voltage boost at low speeds proper flux current maintenance.	A drive that offers this motor control method when torque production must be maximized.
Direct Torque Control (DTC)	High-performance applications often require precise torque control at any speed and often in the face of power dips, load changes and other transients. They require excellent dynamic response and World Class torque regulation. This control may have to be exercised without the use of an encoder on the motor.	A drive with ABB's Direct Torque Control (DTC) technology.

Regulation Type		
Speed	Applications that depend on accurate speed to accomplish the task require a drive that can control or 'regulate' speed.	A drive that regulates speed to the needed accuracy. Methods include open loop, slip compensation and encoder feedback.
Torque	Applications that depend on accurate torque to accomplish the task require a drive that can control or 'regulate' torque. These applications typically control tension or force to produce a high quality product. The motor slip plus magnitude and phase angle of the output current are controlled to produce the commanded torque.	A drive that offers this motor control method when torque control is required.
Slip Compensation	A squirrel-cage motor slips under load. To compensate for this, the frequency can be increased as the motor torque increases.	A drive that provides adjustable slip compensation.
Speed Range	All applications operate over a given speed range, defined as the ratio of maximum continuous speed to minimum continuous speed and is expressed as 10:1, 100:1, etc.	A drive that can produce the needed torque and speed torque regulation (accuracy) over the required speed range.
Torque Proving	Some applications, like cranes, hoists and elevators, use mechanical brakes to hold the motor and driven machinery stationary while the drive is stopped. Prior to the release of this brake, the drive senses adequate current supplied to the motor to prevent dropping the driven machinery when the mechanical brake is released.	A drive that provides torque proving.

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Drive Features and Performance Explanation (continued)

Other Factors to Consider		
Altitude	All drives are rated for specific altitudes. Higher elevations may require derating from the standard rating because of thinner air and subsequent loss of cooling.	A drive rating plus derating to match the application.
EMC Filter	Many applications must meet local, national or global noise standards so they do not interfere with other equipment. EMC filters aid in meeting these standards.	A drive that meets the desired standard with either internal or external filters.
Enclosure Rating	The application's environment determines the amount of protection the drive requires. Elements such as dust, moisture, rain and others can damage an improperly selected drive enclosure.	A drive with the needed IP or NEMA rating to protect itself from the environment.
Operating Temperature	The environment in which the drive must operate may have excessive ambient temperature. Foundries, steel plants and other applications can often have operating ambients that exceed the drive rating.	A drive whose standard or derated power rating meets the need, even in the higher ambient temperature.
Programming Interface	The type of user interface in an application often determines the ease of use and accuracy of performance. The clarity of data and ease of programing make the operation better.	A drive with an operating panel that provides ease of use and precise drive status data.

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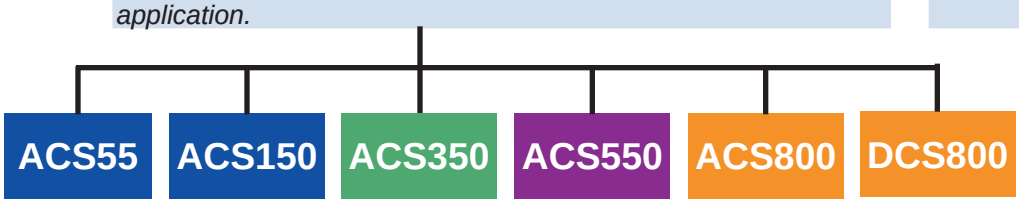
Drive Selection Guide Flowchart

	Process	Action
1	Identify the Application *Use the charts that start on page 16 to help identify the type of application and the likely demands of the drive*	Continue to step 2
2	Gather the load data; system inertia, required accel & decel rates, min and max speed, overload requirements, etc. *The Drive Application Questionnaires that start on page 42 can aid you in gathering this information. This information can often be determined by the performance of the existing motor.*	Continue to step 3
3	Gather the motor data: rated torque, HP/kW, Volts, insulation class, speed, etc. *Whether an existing motor or a new motor is being used, the motor information is critical to choosing a drive. The Drive Application Questionnaires that start on page 42 can aid you in gathering this information.*	Continue to step 4
4	Does the motor meet or exceed the application requirements? *The data gathered in Step 3 must meet or exceed the data from Step 2. This assures that the motor can produce the torque, speed and power required to do the application*	If yes, continue to step 5 If no, replace the existing motor with a new motor and return to step 3
5	Choose a drive. *Match the data gathered in Steps 1-3 against the chart of drive features on pages 4-7. Select a drive that meets the motor requirements and has all the software features needed to do the application.*	Continue to step 6.



	Process	Action
6	Is the drive offered in the correct HP/kW/Amp rating? *The drive you choose must be able to supply the necessary current to the motor to produce the torque required. This includes normal and overload conditions*	If yes, continue to step 7 If no, go to step 5.
7	Is the drive offered in the correct enclosure and environmental ratings? *The drive you choose must be available in an enclosure style that will withstand the application's environment. It also must produce the required current at the application's altitude and ambient temperature*	If yes, continue to step 8 If no, go to step 5.
8	Does this drive have the features needed to meet the application's demands? *The drive you choose must have a feature set that matches the application. It also must have sufficient hardware (I/O, feedback, communications, etc.) to perform the application.*	If yes, continue to step 9 If no, go to step 5.
9	Does this drive have the motor control performance to meet the application demands? *The drive you choose must be able to produce the needed torque at the necessary speeds. It must also be able to control speed and torque depending on the application requirements.*	If yes, continue. If no, go to step 5.

Congratulations!
The ABB drive you have chosen has the features and performance needed to have a successful application. As the leading supplier of adjustable speed drives, ABB can help in nearly any drive application.

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Application Questionnaires

The following pages provide detailed questions based on specific applications. Each of the seven questionnaires are designed to be removed from this book, photocopied, and taken to the job site for quick and easy reference when determining what drive to use for the application.

If you need access to additional copies of the form visit http://www.abb.us/drives and select “Application Cases” from the left menu. This page will contain a link to download PDFs of all seven questionnaires

Index of Applications

Application:	Questionnaire Form:
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Ball Mill	3
Beater Type Mixer	3
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Blown Film	6
Center Driven Winder	4
Centrifugal Compressor	3
Centrifugal Fan/Pump	6
Centrifugal Pump	6
Chain Conveyor	2
Cooling/Baking Conveyor	6
Crane	7
Divertor	4
Engine/Transmission Test Stand	5
Extruder	2
Hoist	7
Induced Draft Fan	6
Injection Molding	6
Palletizer	5
Positive Displacement Compressor	3
Positive Displacement Pump	6
Punch Press	6
Rotary Kiln	2
Screw Compressor	3
Sugar Centrifuge	2
Textile Machines	4

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Application Questionnaire #1

Belt Conveyor

Basic Questions:

Motor Type (AC or DC)

Motor Voltage

Hp or kW

Motor Rated FLA (Amps)

Distance: Drive to Motor (Feet)

Distribution System:

Voltage

Frequency

Phase

Desired Accel Time

Desired Decel Time

Environmental:

Dripping Water?

Oil?

Other?

Washdown?

Airborn Dust?

Additional Questions:

Motor NEMA Design (A,B,C,D,E)

Motor Rated Torque (Ft/Lbs)

Motor Service Factor

Motor Base Speed (RPMs)

Type of Distribution System

Distribution System Grounding

Normal Torque Required (Lb-ft)
For how long?

Overload Torque Required (Lb-ft)
For how long?

Is Torque Required at Zero Speed?
For how long?

Can it Start Fully Loaded?

DC Motors ONLY:

Field Voltage

Field Current

See reverse side for additional questions

Conditional Questions:

Are you re-using an existing motor? (If yes, ask the following questions.)

Motor Insulation Rating (V)		Motor Frame	
Approximate Motor Age (Years)		Motor Catalog or Serial Number	
Motor Manufacturer			

Is the motor synch speed something other than 1500 / 1800 RPM? (If yes, ask the following questions.)

What is the motor name-plate max safe speed (RPM)	

Is the drive less than 5HP and are there voltage spikes on the line? (If yes, ask the following questions.)

Distance: Distribution Trans-former to Drive (Ft)		Distribution System Available Short Circuit Amps, AIC (Amps)	

Is the customer unsure whether the chosen drive is the correct size? (If yes, ask the following questions.)

System Inertia, if known (Lb-Ft^2)		*Only if customer has not calculated required torque/ horsepower*
Reversing?		*Only if customer has not calculated required torque/ horsepower*

Does the application run at very low or very high speeds (less than 15 RPM or more than base speed? (If yes, ask the following questions.)

Speed Range (speeds at which torque is required)		Motor Type (TENV, TEFC, etc.)	
Minimum RPM		Zero Torque required (Rest)? For how long?	
Maximum RPM			

Does Reversing Cause Regeneration? (If yes, ask the following questions.)

High Intertia load (Flywheel, etc)	

Is the Environment abnormal? (If yes, ask the following questions.)

Ambient Temperature		Relative Humidity	
Location (Indoor, Outdoor, etc)		Contaminants	
Direct Sunlight			

Application Questionnaire #2

Chain Conveyor
Extruder
Rotary Kiln
Sugar Centrifuge

Basic Questions:

Motor Type (AC or DC)

Motor Voltage

Hp or kW

Motor Rated FLA (Amps)

Distance: Drive to Motor (Feet)

Distribution System:

Voltage

Frequency

Phase

Desired Accel Time

Desired Decel Time

Environmental:

Dripping Water?

Oil?

Other?

Washdown?

Airborn Dust?

Additional Questions:

Motor NEMA Design (A,B,C,D,E)

Motor Rated Torque (Ft/Lbs)

Motor Service Factor

Motor Base Speed (RPMs)

Type of Distribution System

Distribution System Grounding

Normal Torque Required (Lb-ft)
For how long?

Overload Torque Required (Lb-ft)
For how long?

Is Torque Required at Zero Speed?
For how long?

Can it Start Fully Loaded?

DC Motors ONLY:

Field Voltage

Field Current

See reverse side for additional questions

Conditional Questions:

Are you re-using an existing motor? (If yes, ask the following questions.)

Motor Insulation Rating (V)		Motor Frame	
Approximate Motor Age (Years)		Motor Catalog or Serial Number	
Motor Manufacturer			

Is the motor synch speed something other than 1500 / 1800 RPM? (If yes, ask the following questions.)

What is the motor name-plate max safe speed (RPM)	

Is the drive less than 5HP and are there voltage spikes on the line? (If yes, ask the following questions.)

Distance: Distribution Trans-former to Drive (Ft)		Distribution System Available Short Circuit Amps, AIC (Amps)	

Is the customer unsure whether the chosen drive is the correct size? (If yes, ask the following questions.)

System Inertia, if known (Lb-Ft^2)		*Only if customer has not calculated required torque/ horsepower*
Reversing?		*Only if customer has not calculated required torque/ horsepower*

Does the application run at very low or very high speeds (less than 15 RPM or more than base speed? (If yes, ask the following questions.)

Speed Range (speeds at which torque is required)		Motor Type (TENV, TEFC, etc.)	
Minimum RPM		Zero Torque required (Rest)? For how long?	
Maximum RPM			

Is the Environment abnormal? (If yes, ask the following questions.)

Ambient Temperature		Relative Humidity	
Location (Indoor, Outdoor, etc)		Contaminants	
Direct Sunlight			

Application Questionnaire #3

Auger Conveyor
Ball Mill
Beater Type Mixer
Centrifugal Compressor
Positive Displacement Compressor
Screw Compressor

Basic Questions:

Motor Type (AC or DC)

Motor Voltage

Hp or kW

Motor Rated FLA (Amps)

Distance: Drive to Motor (Feet)

Distribution System:

Voltage

Frequency

Phase

Desired Accel Time

Desired Decel Time

Environmental:

Dripping Water?

Oil?

Other?

Washdown?

Airborn Dust?

Additional Questions:

Motor NEMA Design (A,B,C,D,E)

Motor Rated Torque (Ft/Lbs)

Motor Service Factor

Motor Base Speed (RPMs)

Type of Distribution System

Distribution System Grounding

Normal Torque Required (Lb-ft)
For how long?

Overload Torque Required (Lb-ft)
For how long?

Is Torque Required at Zero Speed?
For how long?

Can it Start Fully Loaded?

DC Motors ONLY:

Field Voltage

Field Current

See reverse side for additional questions

Conditional Questions:

Are you re-using an existing motor? (If yes, ask the following questions.)

Motor Insulation Rating (V)		Motor Frame	
Approximate Motor Age (Years)		Motor Catalog or Serial Number	
Motor Manufacturer			

Is the motor synch speed something other than 1500 / 1800 RPM? (If yes, ask the following questions.)

What is the motor name-plate max safe speed (RPM)	

Is the drive less than 5HP and are there voltage spikes on the line? (If yes, ask the following questions.)

Distance: Distribution Trans-former to Drive (Ft)		Distribution System Available Short Circuit Amps, AIC (Amps)	

Is the customer unsure whether the chosen drive is the correct size? (If yes, ask the following questions.)

System Inertia, if known (Lb-Ft^2)		*Only if customer has not calculated required torque/ horsepower*
Reversing?		*Only if customer has not calculated required torque/ horsepower*

Is the Environment abnormal? (If yes, ask the following questions.)

Ambient Temperature		Relative Humidity	
Location (Indoor, Outdoor, etc)		Contaminants	
Direct Sunlight			

Application Questionnaire #4

Center Driven Winder
Diverter
Textile Machine

Basic Questions:

Motor Type (AC or DC)					
Motor Voltage		Desired Accel Time			
Hp or kW		Desired Decel Time			
Motor Rated FLA (Amps)		Environmental:			
Distance: Drive to Motor (Feet)		Dripping Water?		Washdown?	
Distribution System:		Oil?		Airborn Dust?	
Voltage		Other?			
Frequency					
Phase					

Additional Questions:

Motor NEMA Design (A,B,C,D,E)		DC Motors ONLY:	
Motor Rated Torque (Ft/Lbs)		Field Voltage	
Motor Service Factor		Field Current	
Motor Base Speed (RPMs)			
Type of Distribution System			
Distribution System Grounding			
Normal Torque Required (Lb-ft) For how long?			
Overload Torque Required (Lb-ft) For how long?			
Is Torque Required at Zero Speed? For how long?			

See reverse side for additional questions

Conditional Questions:

Are you re-using an existing motor? (If yes, ask the following questions.)

Motor Insulation Rating (V)		Motor Frame	
Approximate Motor Age (Years)		Motor Catalog or Serial Number	
Motor Manufacturer			

Is the motor synch speed something other than 1500 / 1800 RPM? (If yes, ask the following questions.)

What is the motor name-plate max safe speed (RPM)	

Is the drive less than 5HP and are there voltage spikes on the line? (If yes, ask the following questions.)

Distance: Distribution Trans-former to Drive (Ft)		Distribution System Available Short Circuit Amps, AIC (Amps)	

Is the customer unsure whether the chosen drive is the correct size? (If yes, ask the following questions.)

System Inertia, if known (Lb-Ft^2)		*Only if customer has not calculated required torque/ horsepower*
Reversing?		*Only if customer has not calculated required torque/ horsepower*

Does the application run at very low or very high speeds (less than 15 RPM or more than base speed? (If yes, ask the following questions.)

Speed Range (speeds at which torque is required)		Motor Type (TENV, TEFC, etc.)	
Minimum RPM		Zero Torque required (Rest)? For how long?	
Maximum RPM			

Is the Environment abnormal? (If yes, ask the following questions.)

Ambient Temperature		Relative Humidity	
Location (Indoor, Outdoor, etc)		Contaminants	
Direct Sunlight			

Application Questionnaire #5

Engine/Transmission Stand
Palletizer

Basic Questions:

Motor Type (AC or DC)					
Motor Voltage		Desired Accel Time			
Hp or kW		Desired Decel Time			
Motor Rated FLA (Amps)		Environmental:			
Distance: Drive to Motor (Feet)		Dripping Water?		Washdown?	
Distribution System:		Oil?		Airborn Dust?	
Voltage		Other?			
Frequency					
Phase					

Additional Questions:

Motor NEMA Design (A,B,C,D,E)		DC Motors ONLY:	
Motor Rated Torque (Ft/Lbs)		Field Voltage	
Motor Service Factor		Field Current	
Motor Base Speed (RPMs)			
Type of Distribution System			
Distribution System Grounding			
Normal Torque Required (Lb-ft) For how long?			
Overload Torque Required (Lb-ft) For how long?			
Is Torque Required at Zero Speed? For how long?			

See reverse side for additional questions

Conditional Questions:

Are you re-using an existing motor? (If yes, ask the following questions.)

Motor Insulation Rating (V)		Motor Frame	
Approximate Motor Age (Years)		Motor Catalog or Serial Number	
Motor Manufacturer			

Is the motor synch speed something other than 1500 / 1800 RPM? (If yes, ask the following questions.)

What is the motor name-plate max safe speed (RPM)	

Is the drive less than 5HP and are there voltage spikes on the line? (If yes, ask the following questions.)

Distance: Distribution Trans-former to Drive (Ft)		Distribution System Available Short Circuit Amps, AIC (Amps)	

Is the customer unsure whether the chosen drive is the correct size? (If yes, ask the following questions.)

System Inertia, if known (Lb-Ft^2)		*Only if customer has not calculated required torque/ horsepower*
Reversing?		*Only if customer has not calculated required torque/ horsepower*

Does the application run at very low or very high speeds (less than 15 RPM or more than base speed? (If yes, ask the following questions.)

Speed Range (speeds at which torque is required)		Motor Type (TENV, TEFC, etc.)	
Minimum RPM		Zero Torque required (Rest)? For how long?	
Maximum RPM			

Does Reversing Cause Regeneration? (If yes, ask the following questions.)

High Intertia load (Flywheel, etc)	

Is the Environment abnormal? (If yes, ask the following questions.)

Ambient Temperature		Relative Humidity	
Location (Indoor, Outdoor, etc)		Contaminants	
Direct Sunlight			

Application Questionnaire #6

Blown Molding	Centrifugal Pumps	Injection Molding
Blown Film	Cooling/Baking Conveyor	Positive Displacement Pumps
Centrifugal Fan/Pump	Induced Draft Fan	Punch Press

Basic Questions:

Motor Type (AC or DC)

Motor Voltage

Hp or kW

Motor Rated FLA (Amps)

Distance: Drive to Motor (Feet)

Distribution System:

Voltage

Frequency

Phase

Desired Accel Time

Desired Decel Time

Environmental:

Dripping Water?

Oil?

Other?

Washdown?

Airborn Dust?

Additional Questions:

Motor NEMA Design (A,B,C,D,E)

Motor Rated Torque (Ft/Lbs)

Motor Service Factor

Motor Base Speed (RPMs)

Type of Distribution System

Distribution System Grounding

Normal Torque Required (Lb-ft)
For how long?

Overload Torque Required (Lb-ft)
For how long?

Is Torque Required at Zero Speed?
For how long?

DC Motors ONLY:

Field Voltage

Field Current

See reverse side for additional questions

Conditional Questions:

Are you re-using an existing motor? (If yes, ask the following questions.)

Motor Insulation Rating (V)		Motor Frame	
Approximate Motor Age (Years)		Motor Catalog or Serial Number	
Motor Manufacturer			

Is the motor synch speed something other than 1500 / 1800 RPM? (If yes, ask the following questions.)

What is the motor name-plate max safe speed (RPM)	

Is the drive less than 5HP and are there voltage spikes on the line? (If yes, ask the following questions.)

Distance: Distribution Trans-former to Drive (Ft)		Distribution System Available Short Circuit Amps, AIC (Amps)	

Is the customer unsure whether the chosen drive is the correct size? (If yes, ask the following questions.)

System Inertia, if known (Lb-Ft^2)		*Only if customer has not calculated required torque/ horsepower*
Reversing?		*Only if customer has not calculated required torque/ horsepower*

Is the Environment abnormal? (If yes, ask the following questions.)

Ambient Temperature		Relative Humidity	
Location (Indoor, Outdoor, etc)		Contaminants	
Direct Sunlight			

Application Questionnaire #7

Crane
Hoist

Basic Questions:

Motor Type (AC or DC)					
Motor Voltage		Desired Accel Time			
Hp or kW		Desired Decel Time			
Motor Rated FLA (Amps)		Environmental:			
Distance: Drive to Motor (Feet)		Dripping Water?		Washdown?	
Distribution System:		Oil?		Airborn Dust?	
Voltage		Other?			
Frequency					
Phase					

Additional Questions:

Motor NEMA Design (A,B,C,D,E)		DC Motors ONLY:	
Motor Rated Torque (Ft/Lbs)		Field Voltage	
Motor Service Factor		Field Current	
Motor Base Speed (RPMs)			
Type of Distribution System			
Distribution System Grounding			
Normal Torque Required (Lb-ft) For how long?			
Overload Torque Required (Lb-ft) For how long?			
Is Torque Required at Zero Speed? For how long?			

See reverse side for additional questions

Conditional Questions:

Are you re-using an existing motor? (If yes, ask the following questions.)

Motor Insulation Rating (V)		Motor Frame	
Approximate Motor Age (Years)		Motor Catalog or Serial Number	
Motor Manufacturer			

Is the motor synch speed something other than 1500 / 1800 RPM? (If yes, ask the following questions.)

What is the motor name-plate max safe speed (RPM)	

Is the drive less than 5HP and are there voltage spikes on the line? (If yes, ask the following questions.)

Distance: Distribution Trans-former to Drive (Ft)		Distribution System Available Short Circuit Amps, AIC (Amps)	

Is the customer unsure whether the chosen drive is the correct size? (If yes, ask the following questions.)

System Inertia, if known (Lb-Ft^2)		*Only if customer has not calculated required torque/ horsepower*
Reversing?		*Only if customer has not calculated required torque/ horsepower*

Does Reversing Cause Regeneration? (If yes, ask the following questions.)

High Intertia load (Flywheel, etc)	

Is the Environment abnormal? (If yes, ask the following questions.)

Ambient Temperature		Relative Humidity	
Location (Indoor, Outdoor, etc)		Contaminants	
Direct Sunlight			

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